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REVIEWS

The Coming of Evolution: the Story of a Great Revolution. By JOHN W. JUDD. London and Edinburgh: The Cambridge University Press, 1910. Pp. 171.

The numerous addresses which were delivered in various parts of the world in connection with the recent Darwin Centenary seem to have had for their common burden the revivification of all science by the revolution which Darwin introduced in the biological field. Seldom has it been pointed out, and never before in so convincing a manner, that the acceptance of evolution for the organic world was a direct outgrowth of its demonstration in the field of geological science. It was the publication by Sir Charles Lyell in 1830-33 of his *Principles of Geology*, giving currency to continuity or uniformitarianism in the realm of inorganic nature, that laid the foundations of modern geology and paved the way for modern biology as well. Darwin was first a geologist, and his great debt to Lyell he was ever ready to acknowledge. Says Professor Judd: "Were I to assert that if the *Principles of Geology* had not been written, we should never have had the *Origin of Species*, I think I should not be going too far; at all events, I can safely assert, from several conversations I had with Darwin, that he would have most unhesitatingly agreed in that opinion."

Huxley has given his verdict that "consistent uniformitarianism postulates evolution as much in the organic as in the inorganic world." In dedicating the second edition of his favorite work, the *Narrative of the Voyage of the Beagle*, Darwin wrote: "To Charles Lyell, Esq., F.R.S., this second edition is dedicated with grateful pleasure, as an acknowledgment that the chief part of whatever scientific merit this journal and the other works of the author may possess, has been derived from studying the well-known admirable *Principles of Geology*." To Leonard Horner he wrote: "I always feel as if my books came half out of Lyell's brain." In the *Origin of Species* Darwin refers to "Lyell's grand work on the *Principles of Geology*, which the future historian will recognize as having produced a revolution in Natural Science."

The Coming of Evolution, first in the geological and later in the biological field, has fortunately now been told by a veteran geologist

and one who enjoyed the friendship of all the great leaders in the movement—Huxley, Hooker, Scrope, Wallace, Lyell, and Darwin. Of those who were on terms of affectionate intimacy with both Charles Lyell and Charles Darwin, Professor Judd is perhaps the unique survivor. It is this intimate personal relationship to the chief actors in the great drama, combined with a peculiarly simple and graceful style of writing, which makes the fascination of this little book. At every turn of the page the reader is surprised by the reference to some remark of Lyell, Darwin, or Huxley, which sheds a flood of light upon the psychology of the whole movement.

The great success of the *Principles of Geology* seems in some measure to have been due to Lyell's study of the causes of failure of the *Theory of the Earth* by the illustrious Hutton, whose death occurred the year Lyell was born. On the basis of his extended observations, Hutton as early as 1785 wrote the oft-quoted, "I can see no evidence of a beginning, and no prospect of an end," a blunt statement which antagonized the church, then especially active in hunting heresy. Furthermore, his work was written in a heavy and cumbrous style. Profiting by this example, Lyell schooled himself in graceful, accurate, and forceful expression, and at some pains and with favoring fortune was able to avoid a clash with the established church. In no small measure this was due to an extremely favorable notice of his *Principles* in the *Quarterly Review*, then the champion of orthodoxy. With the geologists of the official Geological Survey, Lyell was less fortunate, and in spite of the general popularity of his epoch-making ideas, they were bitterly fought by the official class of geologists and only slowly won support in this field. Professor Judd's fascinating story of the coming of evolution should find a wide circle of readers, especially among students of natural science.

W. H. H.

North American Index Fossils: Invertebrates. By AMADEUS W. GRABAU AND HERVEY WOODBURN SHIMER. Vols. I and II. New York: A. G. Seiler & Co., 1909 and 1910.

With the rapid accumulation of special literature in the field of systematic paleontology, and the growing inaccessibility of many of the older works except to those having access to large libraries, it is ever becoming more and more difficult for the non-specialist to identify his species of fossils. At the same time, with the growing refinements in stratigraphy, it is ever becoming more important to the stratigraphic